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Some Thoughts on the Development of a Diatom Flora for Freshwater Ecosystems in the Continental United States and a Listing of Recent Taxa Described from U.S. Freshwaters

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Although there has been over one hundred and fifty years of work (Ehrenberg 1854; Bailey 1851), we are far from an understanding of the freshwater, recent diatom flora of the United States. Previous efforts to catalogue the taxa occurring in the surface waters include a listing of approximately 525 taxa by Boyer (1927a, b) and illustrations of nearly 500 freshwater (and marine) taxa by Wolle (1890). The most widely utilized flora, produced by Patrick and Reimer (1966, 1975), included well over 800 taxa, but was incomplete on several levels. It included only araphid and naviculoid forms, dealt with taxa reported up to 1960, and was not exhaustive in its treatment of forms reported up to that time. Regional floras and summaries include the Laurentian Great Lakes by Stoermer and Kreis (1978) and Stoermer et al. (2000) (with over 2100 entries), Ohio (Collins and Kalinsky 1977, approximately 900 taxa), Montana (Prescott and Dillard 1979, with over 540 taxa), Kentucky (Camburn 1982, with just over 500 taxa), Illinois (Dodd 1987, with about 425 taxa), and Nebraska (Elmore 1922, with 234 taxa). Summaries from river systems include the work of Hohn and Hellerman (1963, who enumerated just over 475 taxa) and Patrick (1961, with 280 taxa), while Camburn et al. (1984–1986) and Camburn and Charles (2000) documented over 450 taxa from acid lakes in the eastern U.S. There are a large number of individual floristic works for individual systems or specific areas, such as Rushforth and Squires (1985) who reported 332 diatom taxa from Utah Lake and Kingston et al. (1983) who found 425 taxa from Grand Traverse Bay, Lake Michigan. Because many of these reports for individual localities were generated by ecologists who did not have a taxonomic perspective, it could be argued that the numbers of taxa would actually be more than those detailed in these reports.

Recently, discussions in a number of forums, including Diatom-L, have called for a comprehensive flora of Recent freshwater diatoms of the United States. This call has been especially strong from ecologists, many of whom are engaged in national, state, or local water quality monitoring programs that specify diatoms be used in estimating water quality. These programs are not currently supported by a comprehensive English-language flora (let alone one based on the flora of the country), and the disparate (and growing) literature in the field is becoming inaccessible to many of these workers. The call by ecologists for a flora in support of their work is refreshing, since a large number of previous and current studies lacked such a basic, but important tool. This goes back to major studies on U.S. rivers undertaken in the late 1950s through the early 1970s, (Williams and Scott 1962) as well as programs focused on lakes, for example the U.S. Environmental Protection Agency's country wide survey of lake phytoplankton in the 1970s (U.S. EPA 1975) and the EMAP program initiated in 1980s (e.g., Paulsen and Linthurst 1994; Dixit and Smol 1994) and the current U.S. Geological Survey's NAWQA program focused on rivers (Porter et al. 1993). Not only have these projects been carried out without a flora, but until the publication on the freshwater algae of

North America (Wehr and Sheath 2003), even the most recent key to *genera* in English dated from the late 1950s to the early 1980s (Patrick 1959; Vinyard 1979; Barber and Haworth 1981) and reflected the taxonomic approach of those times.

A flora, of course, not only supports applied research projects such as water quality monitoring, but a wide range of basic research questions are implicit in and supported by a flora, including taxonomic revisions and monographs, phylogeny reconstruction, biogeographic studies, as well as ecological, physiological, restoration and conservation biology research programs (Kociolek and Stoermer 2001). The linkage between the floras of central Europe (Krammer and Lange-Bertalot 1986, 1988, 1991a, b) and New Caledonia (Moser et al. 1998) and revisions of the genera *Cymbella* (Krammer1997a, b, 2003), *Pinnularia* (Krammer 1992, 2000), *Navicula* (Lange-Bertalot 2001), *Gomphonema* (Reichardt 1995, 1999; Reichardt and Lange-Bertalot 1991), *Brachysira*, and *Nupela* (Lange-Bertalot and Moser 1994) is clear.

The Challenge of a Flora for the United States

Lack of a flora for the United States is probably due less to the tremendous flux in taxonomy, proliferation of taxonomic literature, or the fact that we are still in a discovery phase for the description of diatoms (Fourtanier and Kociolek 1999), but, rather, a number of other basic, practical considerations. These considerations include:

Size of the country: The continental United States is approximately 9.8 million square kilometers, with the 48 contiguous states stretching a distance equivalent West to East from Portugal to the Ukraine, and North to South from the United Kingdom to North Africa (2005, *Times Atlas of the World*).

Diversity of habitats: Habitats range from subtropical to boreal, three marine coasts to numerous, substantial mountain ranges and major river systems of the Mississippi, Missouri, Columbia, Colorado and Potamac rivers. Potapova and Charles (2003) have discussed the variables effecting the distribution of riverine diatoms across the U.S., and noted that environment, geography and altitude factors help account for the biogeographic distributions of diatoms. Because many of the evaluations have been generated by goal-oriented ecological studies, many times diverse habitats have not been sampled. An example of such an ecosystem might be deep-living communities in lakes (Stoermer 1981).

Still relatively unexplored: The size and diversity of habitats have contributed to the situation in that the country is relatively unexplored from a phycological perspective, and from the perspective of a diatomist. In addition to the 3 attempts to synthesize knowledge about the diatom flora of the United States (Boyer 1927a, b; Wolle 1890; Patrick and Reimer 1966, 1975), there have been regional floras and summaries (Kociolek and Spaulding 2003; see above). While the physical sample resources are probably already in place to undertake a flora (housed primarily at the Academy of Natural Sciences of Philadelphia, California Academy of Sciences, and the Botany Department of the Smithsonian Institution), most have not been "explored" to any great degree. There are still relatively few samples, however, from major parts of the country (see below).

Number of people to do the work: The number of formally trained freshwater diatom taxonomists in the United States is modest, relative to the size of the country. Though training programs at universities have existed for an extended period, both in terms of specialized summer courses and short-term training sessions as well as Master's and Doctoral. programs, there are probably fewer of these today than even when I began my career in the early 1980s. In fact, we have seen only a single generation of expertise become resident at an institution; continuity has been lost after the founding professor/lab has been dismantled. A lack of continuity and sustainability of tax-

onomists and curators in universities and museums can also be argued, as long-term commitment has been replaced by short-term projects. Short-term projects may result in the deposition of slides into collections: however, systematic treatments and description of taxa new to science are rare or lacking. Overall, the intellectual infrastructure is diminishing, as the focus in many institutions of higher learning tends towards a more reductionist perspective. Kociolek and Stoermer (2001) discuss this issue and the continuing need to include a broader community of taxonomists, many trained outside the U.S. university system, to apply expertise in the identification of diatoms. This expertise will have to include people whose main interest has not been taxonomy, but who use taxonomy to help answer questions related to ecology, climatology and geology.

Tools to Carry Out a Modern Flora

A modern flora is both a synthesis of existing data and discovery of new information, whether it results in descriptions of new species, new records, and/or new information on the distribution (expanded or more narrowly circumscribed than previously thought) of taxa. A basic approach is to understand first what has been reported previously, and confirm (or refute) the presence those taxa. Such a synthesis requires some basic tools. These tools include:

Checklist: This is a complete listing of taxa reported from an area (in the context of this discussion, the 48 contiguous United States). Such a checklist does not currently exist. Stoermer and Kreis (1978) and Stoermer et al. (2002) have generated such a list for the Laurentian Great Lakes, and as indicated above, such lists have been generated for a few parts of the country. An effort is now underway to compile this list, reviewing the hundreds of reports of diatoms from the published literature. The list currently contains over 4500 names. This is not "THE Final Definitive" list of taxa, however: it will be reduced and also receive additions as it is applied in floristic research. This list, for example, contains synonyms of two sorts. The first kind of synonym in such a list will be names based on a single type (a nomenclatural synonym). For example, *Achnanthes lanceolata* (Brébisson) Grunow and *Planothidium lanceolatum* (Brébisson) Round & Bukht. would both be included in such a list, but the two names refer to a single entity, based on a type initially described by Brébisson. The second kind of synonym that would occur in a checklist of this kind is one where two (or more) taxa described from different types are considered a single entity (a taxonomic synonym). An example of this sort would be whether *Cymbella diluviana* (Krasske) Florin and *C. couleensis* Sovereign are the same (Patrick and Reimer 1975) or different (Sovereign 1963) species. Evaluation of these situations can be resolved by monographic or revisionary studies. The initial list of 4400+ names based on the published literature will certainly be reduced, due to synonymy, but also greatly expanded by additions.

Nomenclature: One way to track the nomenclatural synonymies is with a database of names. The California Academy of Sciences is undertaking this mammoth effort and has developed a database of over 55,000 entries. The database includes the names included in all of the previously published catalogues (Habirshaw 1877; Chase 1885, 1907; Peragallo 1897–1903; Mills 1933–1935; Van Landingham 1967–1979), entries from two institutional card files (*New Species File* from ANSP and the *Index Nominum Algarum*, University of California, Berkeley) and additional entries from the primary literature. Discrepancies with respect to the information from these sources are tracked in the database (name, author, place, date and specifics of publication) and are being rectified by reviewing the original publications. This database has been demonstrated at a number of national (North American Diatom Symposium) and international (International Diatom Symposium) meetings. Publication of this work is expected to commence in 2006; it is expected ultimately to consist of 4–6 volumes.

Access to types: For comparison and verification of taxon identities, it is preferable in floristic work to be able to access the type(s) of the taxa under consideration. This was the approach taken by Patrick and Reimer in their floristic work, and it continues to provide great added value to that work and subsequent works. Several publications can facilitate identifying the location of types of diatom taxa from freshwater environments, including those of Mahoney and Reimer (1997), Kociolek et al. (1999), Lange-Bertalot et al. (1996 on the collection of Krasske), Krammer (*Cymbella* 1997a, b, 2002; *Pinnularia* 1992, 2000), Williams (*Diatoma* 1985) and the excellent work by Simonsen (1987) on the collection of Friedrich Hustedt. From the preliminary list of 4400+ names in the checklist being developed, about 50% of the names are associated with types that can be traced to a specific institution and material (sample and/or slide). When the names attributed to Agardh, Bailey, Cholnoky, Ehrenberg, Gregory, Grunow, Kützing, Rabenhorst, W. Smith, and Van Heurck are included (since we know the institutions those collections are housed, though specific samples may not have been identified as the types for each taxon), the percentage of types accessible rises to nearly 85%. This suggests access to types for comparison could be accomplished for many of the names on the checklist and this critical tool could be in place to support a flora project. In fact, development of a research tool that indicates the range of morphological expression of the types would be one of the first steps in undertaking the flora for the U.S.

Samples: Access to samples for floristic work is important for a number of reasons. Verification of taxa reported in the literature many times requires access to material, that is the samples or slides used by the author who described the flora. Extant samples also allow those involved in the production of the flora to assess the areas under study that require additional sampling. Many workers in the U.S. have excelled in ensuring their collections are accessible in some fashion. A tragedy has been that the samples from several major national water quality monitoring/estimation efforts were not retained, thereby negating any way to leverage those samples for future research, including development of a flora, later comparative work, etc. The role museums play in storing, caring for and making accessible these important scientific research resources is hugely important. Collections of Patrick, Reimer, Boyer, Theriot, and many types of freshwater diatoms described from the United States and elsewhere are housed at ANSP, while the collections of Kociolek, Stoermer, Van Landingham, Elmore, Rushforth, Sovereign and G.W. Prescott are housed at CAS. Nearly 90% of the types for which we can identify a slide are housed at either ANSP or CAS (Table 1). Samples from the NAWQA project are housed at both institutions. The Botany Department of the Smithsonian Institution houses about 15,000 slides from one of EPA's water quality monitoring projects. It includes most of the major river systems in the continental U.S., which were sampled monthly over a period of time. In some cases the period of sampling was only for 2 years, but others the sampling period was continuous for a decade or more. While the collection resources currently available are impressive, and could support in large part an effort to document the freshwater diatom flora of the United States, it seems clear that some parts of the country are not well represented in these collections. These areas include, but are not limited to, the Rocky Mountains, the Sierra Nevada Mountains, the Deep South, southern Plains states, southern California, and the southwestern U.S.

Preliminary List of Diatoms Described from U.S. Freshwaters

One approach to establishing the flora of the U.S. would be to document those taxa that have been described as new from U.S. localities; a preliminary list of these taxa is presented in Table 1.

Nearly 600 taxa have been described as new from freshwater environments in the continental United States. Genera with the most taxa described from the U.S. include *Navicula* (148 taxa),

Pinnularia (66 taxa), *Gomphonema* (39 taxa), *Cymbella* (31 taxa), and *Eunotia* (31 taxa), *Nitzschia* (27 taxa), *Achnanthes* (24 taxa) and *Neidium* (23 taxa). There are several genera in which a single taxon has been described, including *Adlafia*, *Diploneis*, *Tetracyclus*, *Cymatopleura*, *Cyclostephanos*, *Mastogloia*, *Peronia*, and *Pleurosigma*; many of these genera are better represented in the brackish or marine environments, or part of relatively small genera.

It is somewhat surprising that the genera *Cyclotella* and *Stephanodiscus* have so few new taxa described from the U.S. Likewise, the number of species described from U.S. in the nitzschioid and surirelloid genera is remarkably low. In fact, there are almost as many new taxa of *Neidium* (23 taxa), a genus of relatively restricted ecological distribution, described from the U.S. as there are taxa of the more eurytolerant (at the level of genus) *Nitzschia* (24 taxa). These discrepancies must be attributable to the lack of monographs on these genera. Genera that are only known in the U.S. flora include *Playaensis* Spaulding & Kociolek, *Sarcophagodes* Morales and *Pseudostaurosiropsis*. Absence of reports from other areas may be due to their relatively recent discovery.

In terms of geography, the areas supporting the most new taxa are Oregon (83 taxa), Pennsylvania (52 taxa), Florida (51 taxa), South Carolina (49 taxa) and the state of Washington (36 taxa). While Oregon and Washington, as well as Florida might be seen as unique areas, somewhat surprising is the relatively large number of taxa described from the eastern coastal plain. Of course, these areas have received the greatest amount of attention from diatomists, especially South Carolina, and the Savannah River, which have been monitored heavily due to the presence of a nuclear power plant. The bottom line is areas that receive any detailed attention have been found to bear new taxa, and this is emphasized by the work on the Laurentian Great Lakes, Iowa, and the east coast of the U.S. also showing many taxa being described from those areas. Lack of new taxa from many parts of the U.S. is due probably more to lack of attention than lack of interesting species. It is still the situation that some of the lists developed by Ehrenberg (1854) for parts of the Deep South are in fact the only published information on freshwater recent diatoms from the area.

Table 1 also reminds us how many taxon names we do not see referenced in the current literature. While most taxonomists know of the works of Patrick and Reimer, it may be surprising that more species have been described from the continental United States by the late Matthew Hohn (72 taxa) than either Ruth Patrick (47 taxa) or Charles Reimer (40 taxa), yet few of the taxa authored by Hohn are noted in the U.S. flora. Likewise, species such as *Cocconeis patrickae* Reimer and *Navicula daileyi* Reimer, both known from Indiana, are rarely reported. This lack of reporting of these names is due to the fact that the work of Hohn and these names of Reimer were not included in the flora of Patrick and Reimer (1966, 1975). Descriptions of new taxa in the primary literature do not readily, if at all, get into the parlance of practicing taxonomists. Thus, the need for a new U.S. flora is underscored to summarize and make more accessible the vast data on the diatom flora of freshwaters in the U.S., especially that information in the primary literature that has accumulated for more than 40 years since Patrick and Reimer reviewed and incorporated the primary literature into a flora.

Conclusions

Although we have come a long way in our studies of the diatom flora of the U.S., we are far from achieving a complete understanding. The obstacles to gaining a fuller understanding are difficult, and the time, people, and financial resources to gain such knowledge are daunting. I must say, however, that the development of a U.S. flora will be modest in cost relative to the utility of the work and the amount being spent on projects that are operating without such a basic tool.

In addition to the taxonomic infrastructure that is being put into place that could be used to great benefit in the development of a U.S. freshwater diatom flora, there are also some advances in

other research tools that could facilitate a project of this scope. One example can be found dealing with the freshwater diatoms of south Florida (*http://serc.fiu.edu/periphyton*). These tools should include mature structures of complex databases that support the organization and sharing of information both internally and with collaborators across the country and the world. These are already used by ANSP and CAS to organize the material, slides and identifications for internal use, and for searching by external users, but also facilitate input from individuals outside the institutions (see the system in place at ANSP at *http://www.diatom.acnatsci.org/AlgaeImage*).

Perhaps one of the greatest leaps in the development of species descriptions, monographs, taxonomic revisions and floras in the last 20 years has been documentation of variability within a taxon. This has been done by incorporating many micrographs into the work (examples include Kociolek and Stoermer 1988, Krammer and Lange-Bertalot 1986–1991; Krammer 2003). This approach has been facilitated in more recent times by the development of digital imaging, where publication-quality images can be received directly from microscope to computer, without the time-consuming process of artists drawing the specimen or the processing of film and printing of prints. In the development of a modern flora, this is by far one of the best timesaving devices.

No one laboratory, probably no one institution, can alone do this work within a reasonable time frame. Such a task will require a team of taxonomic experts. It will involve accessing materials from numerous herbaria, and a complicated management plan so that the large task of evaluating and synthesizing past work can happen, but also allowing time for a "discovery" effort to occur.

A modern flora will of necessity be a flexible and up-datable system (for a similar view, see Wheeler et al. 2004) that is distributed, such that it can support a team of collaborators and be applied by an international body of users. A flora then is an information system, in this case for the freshwater diatoms of the U.S. It requires a well thought-out framework for information capture and management (i.e. database), which supports potentially a wide range of users. Though such an approach can require time to develop and populate with data, it can result in reproducible results (because data are tied to specimens that can be reviewed by future workers), and allow the basic information to be leveraged across a variety of fields for research and educational uses. It seems to me that we can build on the great body of work that has been accomplished over the last 150 years, including the floras that have been developed previously. With the legacy of previous workers whose collections have been maintained and are accessible for study by current (and future) generations, and the near completion of important research tools, we are well positioned to commence immediately and realize this important work.

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TABLE 1. Listing of taxa, type locality and types (type designation, institution, and slide number) of diatoms described as new to science for the United States. H=holotype; I=isotype; Icono=Iconotype; L=lectotype; ANSP=Academy of Natural Sciences of Philadelphia; B= Botanical Museum, Berlin, Dahlem; BHUPM=Humboldt University Paleontological Museum, Berlin; BM=British Museum, London; BRM=Alfred Wegener Institute, Bremerhaven; CAS=California Academy of Sciences; NAU=Northern Arizona University, Flagstaff; NW=Naturhistoriseches Museum, Wien; USNM=U.S. National Museum [National Museum of Natural History, Washington, D.C.]; IOK=Collection of K. Krammer; ILL= Iowa Lakeside Lab Collection; ISU=Herbarium of Iowa State University; Lange-Bertalot=Collection of H. Lange-Bertalot at G.W. Goethe-Institute, Frankfurt, Germany; VH=Van Heurek Collection, Antwerp;

Taxa	*Type locality* (*State*:*specific locality*)	*Types* (*Designation*:*Institution*:*Slide*)
Achnanthes americana Cleve 1895	[MA: Waltham]: Crane Pond	
Achnanthes biporoma Hohn & Hellerman 1963	GA/NC: Burke Co.-Barnwell Co., Savannah River	H:ANSP:44261a
Achnanthes chilensis var. *subaequalis* Reimer	FL: Santa Rosa Co., Escambia River	H:ANSP:4451a
Achnanthes curvirostrum Brun	CT: Mories Cove	
Achnanthes decipiens Reimer 1966	SC: Aiken Co., Upper Three Runs Creek	H:ANSP:44260a
Achnanthes deflexa Reimer in Patrick & Reimer 1966	IN: Marshall Co., Lake Maxinkuckee	H:ANSP:1931
Achnanthes deflexa var. *alpestris* Lowe & Kociolek 1984	Great Smoky Mountains National Park, Big Creek	H:ANSP:53918
Achnanthes detha Hohn & Hellerman 1963	GA/SC: Burke Co.-Aiken Co., Upper Three Runs	H:ANSP:44272a
Achnanthes harveyi Reimer 1966	SC: Aiken Co., Upper Three Runs	H:ANSP:44254a
Achnanthes lanceolata var. *abbreviata* Reimer 1966	SC: Allendale Co., Savannah River	H:ANSP:43857a
Achnanthes lanceolata var. *apiculata* Patrick	PA: Pike Co. Shohola Falls	H:ANSP:2190
Achnanthes lanceolata var. *omissa* Reimer in Patrick & Reimer 1966	IA: Dickinson Co. Lake West Okoboji	H:ANSP:8526
Achnanthes lanceolatoides Sovereign	OR: Crater Lake	H:CAS:205076
Achnanthes lewisiana Patrick	PA: Pike Co. Shohola Falls	H:ANSP:2210
Achnanthes linearis f. *curta* H.L. Smith	NJ: Elm, sides of greenhouse tank	L:ANSP:Boyer A-II-21
Achnanthes monela Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44914
Achnanthes oestrupii var. *parvula* Patrick 1945	PA: Pike Co., Shohola Falls	H:ANSP:63786
Achnanthes peragalli var. *fossilis* Tempère & Peragallo	CT: Tamarack Swamp	I:CAS/ANSP:T & P (2) 211, 212
Achnanthes prava Sovereign	OR: Klamath Co., Crescent Lake	H:CAS:205088
Achnanthes reimeri Camburn	SC: York Co., Long Branch Creek	H:ANSP:53752
Achnanthes ricula Hohn & Hellerman 1963	MD: Potomac River	H:ANSP:44468
Achnanthes rupestoides Hohn 1961	FL: Silver Springs	H:ANSP:44476
Achnanthes stewartii Patrick	PA: Pike Co., Lake Wallenpaupack tributary	H:ANSP:2194
Achnanthes sublaevis var. *crassa* Reimer in Patrick & Reimer 1966	NJ: Mercer Co., Assunpink Creek	H:ANSP:44716a
Achnanthes subrostrata var. *appalachiana* Camburn & Lowe 1979	SC: York Co., Long Branch Creek	H:ANSP:53753
Achnanthes temperei Peragallo in Tempère & Peragallo	CT: Quinnipac River, Davis Pit	I:CAS/ANSP:T & P (2) 187
Achnanthes thermalis var. *rumrichorum* Lange-Bertalot in Lange-Bertalot & Krammer 1989	AZ: "Quitobaquito"	H:Lange-Bertalot. AM/N 16

Achnanthidium rivulare Potapova & Ponader	NH: Pennichuck Brook	H:ANSP:57579; I:CAS:221075
Actinella punctata Lewis	NH: Saco Pond	L:ANSP:Febiger 2372
Actinocyclus niagarae H.L. Smith 1878	OH: Lake Erie, Clevelans	
Adlafia multnomahii Morales & Lee 2004	OR: Multnomah Co., Willamette River	H:ANSP:105793a
Amphipleura lindheimeri Grunow	TX: Comale Creek	
Amphiprora ornata J.W. Bailey	FL: Withlacoochee River	
Amphora birugula Hohn 1961	FL: Silver Springs	H:ANSP:44483 (Hohn says "44484")
Amphora bullatoides Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469
Amphora calumetica (Thomas) M. Peragallo	Lake Michigan	
Amphora cruciferoides Stoermer & Yang 1971	Lake Michigan	H:CAS:Stoermer 1545
Amphora hemicycla Stoermer & Yang 1971	Lake Michigan	H:CAS:Stoermer 1574
Amphora huronensis Stoermer & Yang 1971	Lake Michigan	H:CAS:Stoermer 1258
Amphora menisca Hohn & Hellerman 1963	MD: Potomac River	H:ANSP:44466
Amphora michiganensis Stoermer & Yang 1971	MI: Cheboygan Co., Douglas Lake	H:CAS:Stoermer 1165
Amphora neglecta Stoermer & Yang 1971	Between Lake Michigan and Lake Macatawa	H:CAS:Stoermer 1520
Amphora sabiniana Reimer in Patrick & Reimer 1975	TX: Orange Co., Sabine River	H:ANSP:8027
Amphora subcostulata Stoermer & Yang 1971	Lake Michigan	H:CAS:Stoermer 1565
Anomoeoneis fogedii Reimer 1982	IA: Dickinson Co., Excelsior Fen	H:I.L.L.:SP33
Anomoeoneis follis var. *hannae* Reimer in Patrick & Reimer 1966	NJ: Ocean Co., Toms River	H:ANSP:Boyer 818
Anomoeoneis follis var. *fossilis* Reimer in Patrick & Reimer 1966	FL: Santa Rosa Co., 1½ miles NE of Milton	H:ANSP:45101
Anomoeoneis serians (Brébisson) Cleve	Several localities including NY and MA	
Anomoeoneis serians f. *undulata* Hustedt 1959	AL: Mobile	H:BRM:Nd/83
Anomoeoneis serians var. *apiculata* Boyer	NH: Carroll Co., Bemis Lake	N:ANSP:Boyer 392
Anomoeoneis sphaerophora var. *minor* Kociolek & Herbst	CA: Mono Lake	H:CAS:216060
Aulacoseira distans var. *septentrionalis* Camburn & Charles 2000	MI: Schooleraft Co., Cusino Lake	H:ANSP:57551
Caloneis columbiensis Cleve 1894	OR: Columbia River	
Caloneis lewisii Patrick	RI: Newport, Northam's Pond	H:ANSP:2018
Caloneis lewisii var. *inflata* (Schultze) Patrick	NY: Staten Island, Clifton	
Caloneis oregonica (Ehrenberg) Patriek	OR	
Caloneis permagna (Bailey) Cleve	NY: Hudson River at West Point	
Caloneis psendoschnmmaniana (Hustedt) Simonsen 1987	WA: Tacoma	H:BRM:N6/92
Caloneis salebrastriata Hohn 1961	FL: Silver Springs	H:ANSP:44484

Caloneis speciosa (Hustedt) Boyer	WA: Tacoma	H:BRM:N6/92
Capartogramma crucicula (Grunow) Ross	New England; Merrimac River, on Chara	
Cestodiscus baileyi H.L. Smith 1878	OR: Lower Klamath Lake, Lost River	
Chaetoceros elmorei Boyer 1914	ND: Devil's Lake	L:ANSP:Boyer X-V-1
Chaetoceros holmii Graebner & Wujek	MI: Tttabawassee R. at Midland	H:ANSP:53766
Cocconeis delalineata Hohn 1961	FL: Silver Springs	H:ANSP:44474
Cocconeis delapunctata Hohn 1961	FL: Silver Springs	H:ANSP:44489
Cocconeis fluviatilis Wallace	SC: Allendale Co., Savannah River	H:ANSP:3872b
Cocconeis inusitatus Hohn 1961	FL: Silver Springs	H:ANSP:44474
Cocconeis klamathensis Sovereign 1958	OR; Upper Klamath Lake	H:CAS:205074
Cocconeis patrickiae Reimer 1961	IN: Randolph Co., Cabin Creek bog	H:ANSP:45669
Cocconeis placentula var. *euglypta* (Ehrenberg) Cleve	FL	
Cocconeis rugosa Sovereign 1958	OR	H:CAS:205075
Coscinodiscus subtilis var. *radiatus* Hohn 1952	NY: Genesee Co., Bergen Swamp	H:Wiegand Herb. Cornell:162
Cyclostephanos tholiformis Stoermer et al. 1987	IA: Dickinson Co., W. Lake Okoboji, Lazy Lagoon	H:ANSP:63787
Cyclotella aliquantula Hohn & Hellerman 1963	TX: Hardin Co., Neches River	H:ANSP:8024
Cyclotella americana Fricke	America	
Cyclotella bodanica var. *michiganensis* Skvortzow 1937	Lake Michigan	
Cyclotella bodanica var. *stellata* Skvortzow 1937	Lake Michigan	
Cyclotella facetia Hohn & Hellerman 1963	TX: Hardin Co., Neches River	H:ANSP:8102
Cyclotella gamma Sovereign	WA: San Juan Co., Orcas Island, Lake Killebrew	H:CAS:205087
Cyclotella michiganiana Skvortzow 1937	Lake Michigan	
Cyclotubicoalistus undatus Stoermer et al. 1990	SC: Barnwell Co. L Lake	H:ANSP:55688
Cymatopleura mannii M. Peragallo in Tempère & Peragallo 1909	OR: Klamath Co., Swan Lake	I:CAS/ANSP: T & P (2) 365, 366
Cymbella acutiuscula Cleve 1894	MA: Waltham, Crane Pond	
Cymbella americana A.Schmidt 1885	RI: North Providence	
Cymbella buechleri Krammer 2002	ID: Oreana, Pickett Creek	H:IOK:808B
Cymbella cesati var. *linearis* Reimer 1961	IN: Randolph Co., Cabin Creek bog	H:ANSP:45669
Cymbella cistula var. *crassa* Tempère & Peragallo 1909	OR: Klamath Co., Swan Lake	I:CAS/ANSP: T & P (2) 365, 366
Cymbella couleensis Sovereign	WA: King Co., Shadow Lake	H:CAS:206006
Cymbella cucumis var. *delicata* Tempère & Peragallo1909	OR: Klamath Co., Swan Lake	I:CAS/ANSP: T & P (2) 365, 366

Cymbella curta A. Schmidt 1885	[WA]: Fort Ludlow	
Cymbella dissimilis M. Peragallo in Tempère & Peragallo 1909	OR: Klamath Co., Swan Lake	I:CAS/ANSP: T & P (2) 365, 366
Cymbella dorsirostrata Krammer 2002	UT: Zion National Park	H:IOK:799
Cymbella duplopunctata Krammer 2002	ID: Oreana, Pickett Creek	H:IOK:808B
Cymbella elizabethana Krammer 2002	ID: Oreana, Pickett Creek	H:IOK:808B
Cymbella formosa Hustedt 1955	OR: Pitt River	L:BRM:T2/24
Cymbella gibba J.W. Bailey	CA: Honey Lake Valley	L:ANSP H.L. Smith 72-641
Cymbella gibbernla Hustedt	OR: Oregon River	H:BRM:T1/72
Cymbella heteroplenra var. *subrostrata* Cleve	ME: Cherryfield	
Cymbella janischii A. Schmidt	CA: San Francisco	
Cymbella lanceolata var. *cornnta* (Ehrenberg) Grunow	CT: New Haven	
Cymbella langii MacLaughlin & Andrews	NM: Rio Arriba Co.	H:USNM:20560
Cymbella mexicana var. *janischii* (A. Schmidt) Reimer	CA: San Francisco	
Cymbella microcephala var. *crassa* Reimer	TX: Guadalupe Co., Guadalupe River	H:ANSP:6590a
Cymbella nnelleri f. *ventricosa* (Tempère & Peragallo) Reimer	NJ: Weequachick Lake	L:ANSP T & P 524
Cymbella ornata Hustedt Hustedt 1931	OR: Columbia River	H:BRM:T2/4
Cymbella perfossilis Krammer 2002	OR: Terrebone	H:IOK:812
Cymbella procera Hustedt Hustedt 1931	OR: Columbia River	H:BRM:T2/17
Cymbella proxima f. *gravida* Reimer in Patrick & Reimer 1975	IN: Marshall Co., Lake Maxinkuckee	H:ANSP:1909
Cymbella rainierensis Sovereign	WA: Mt. Rainier National Park, Mowich Lake	H:CAS:206007
Cymbella robertii Krammer 2002	ID: Oreana, Pickett Creek	H:IOK:808B
Cymbella schubartoides Camburn & Charles 2000	NY: Franklin Co., Grass Pond	H:ANSP:57555
Cymbella triangnlum (Ehrenberg) Cleve	NY: "Vivum in Niagara"	
Denticnla lanta J.W. Bailey	CA: Suisun Bay	I:ANSP:H.L. Smith B-85
Denticnla rainierensis Sovereign	WA: Mt. Rainier National Park,	H:CAS:206008
Diatoma anceps (Ehrenberg) Kirchner	MA: Pellham	
Diatoma anceps var. *constricta* Tempère & Peragallo 1912	CT: Plymouth, Todd Hollow	I:CAS/ANSP: T & P (2) 728, 729
Diatoma anceps var. *linearis* M. Peragallo	CT: Hartford Co., Bristol, Fall Mountain	L:ANSP T & P (2) 104
Diploneis smithii var. *dilatata* (M. Peragallo) Boyer	CT: Bristol, Fall Mountain	I(?):ANSP: T & P (1) 104
Encyonema evergladianum Krammer 1997b	FL: Everglades	H:IOK:1068C
Encyonema formosnm (Hustedt) D.G. Mann	OR: Pitt River	L:BRM:T2/24
Encyonema gibbnm (J.W. Bailey) Krammer 1997a	CA: Honey Lake Valley	L:ANSP:H.L. Smith 72-641
Encyonema holmii (Van Landingham) Krammer 1997b	KY: Mammoth Cave National Park	
Encyonema inelegans (Cleve) Mills	OR: Pitt River, Fall River	I:BRM:T1/51(?)
Encyonema parallelnm M. Peragallo in Tempère & Peragallo 1909	OR: Klamath Co., Swan Lake	I:CAS/ANSP: T & P (2): 365, 366
Encyonema silesiacnm var. *elegans* Krammer 1997a	FL: Everglades	H:IOK:1042C
Encyonema temperei Krammer 1997b	NJ: Weequachick Lake	L:ANSP:T & P (1): 524

Encyonema thermale Krammer 1997b	[WY]: Yellowstone National Park, Geyser 2	H:BRM:T3/100
Encyonema triangiliforme Krammer 1997a	OR: Terre Bone	H:IOK:833
Encyonema triangulum Kützing	[NY]: "Vivum in Niagara"	
Encyonema turgidum var. *ventricosa* Tempère & Peragallo	NJ: Weequaehiek Lake	L:ANSP:T & P (1): 524
Encyonema yellowstonianum Krammer 1997a	[WY]: Yellowstone National Park, Firehole River	H:IOK:1032; I:IOK:1033
Encyonopsis floridana Krammer 1997b	FL: Clermont	H:IOK:804
Encyonopsis kriegeri var. *fossilis* Krammer 1997b	[NH]: Bemis Lake, White Mountains	H:VH:544
Encyonopsis radialis Krammer 1997b	[WY]: Yellowstone National Park	H:IOK:1044
Encyonopsis stodderi (Cleve) Krammer 1997b	NH: Bemis Lake, White Mountains	L:VH:Cleve & Moller 274
Encyonopsis subspicula Krammer 1997b	NH: Bemis Lake, White Mountains	H:IOK:1173F
Encyonopsis substodderi Krammer 1997b	NH: Bemis Lake, White Mountains	L:VH:Cleve & Moller 274
Encyonopsis symmetrica Krammer 1997b	ME: Cherryfield	H:VH:Cleve & Moller 168
Entomoneis ornata (J.W. Bailey) Reimer	FL: Withlacooehee River	
Entomoneis pulchra (J. W. Bailey) Reimer	FL: at Enterprise	
Epithemia emarginata Andrews	WI: Jackson Co., Trempealeau Valley	
Epithemia hyndmanii var. *capitata* M. Peragallo	OR: Klamath Co., Swan Lake	L:ANSP:T & P (2) 366
Epithemia truncata M. Peragallo	OR: Klamath Co., Swan Lake	L:ANSP:T & P (2) 366
Epithemia truncata var. *debilis* M. Peragallo	OR: Klamath Co., Swan Lake	L:ANSP:T & P (2) 366
Epithemia westermannii var. *stricta* Tempère & Peragallo 1909	OR: Klamath Co., Swan Lake	I:CAS/ANSP: T & P (2) 365, 366
Eunotia arcus var. *uncinata* (Ehrenberg) Grunow	ME: Blue Hill Pond	
Eunotia bilii Lowe & Kociolek 1984	Great Smoky Mountains National Park	H:ANSP:53917
Eunotia carolina Patriek 1958	GA: Mouth of Upper Three Runs	H:ANSP:44254a
Eunotia clavata Hustedt 1913	OR: Columbia River	L:BRM:X11/37
Eunotia collinsii Kalinsky 1984	LA: Bossier Parish, Cypress Bayou Res.	H:ANSP:53901
Eunotia compacta Hustedt Hustedt 1913	OR: Columbia River	L:BRM:X11/33
Eunotia didyma var. *inflata* Hustedt 1913	NV: Kings River	L:BRM:239/63
Eunotia incurvata Hustedt 1913	OR: Columbia River	L:BRM:X11/37
Eunotia hinziae Simonsen 1987	OR: Columbia River	L:BRM:L3/12
Eunotia hinziae var. *diodon* Simonsen 1987	OR: Columbia River	L:BRM:X11/37
Eunotia lata Hustedt 1933	NJ: Atlantie City	H:BRM:L2/26
Eunotia luna Ehrenberg	OR	
Eunotia luna var. *intermedia* Hustedt ex Simonsen 1987	OR: Columbia River	L:BRM:X11/37
Eunotia luna var. *elongata* Hustedt ex Simonsen 1987	OR: Columbia River	L:BRM:X11/33
Eunotia luna var. *aequalis* Hustedt ex Simonsen 1987	OR: Columbia River	L:BRM:X11/37
Eunotia luna var. *globosa* Hustedt ex Simonsen 1987	OR: Columbia River	L:BRM:X11/37
Eunotia luna var. *trapezica* Hustedt	OR: Columbia River	L:BRM:X11/37
Eunotia obesa var. *wardii* Patriek 1958	AL: Mobile, Spring Hill	H:CAS:NY Ward C-7-17-N
Eunotia parallela Ehrenberg	USA	

Eunotia pectinalis var. *ventricosa* Grunow	NY: West Point	
Eunotia pocosinensis Gaiser & Johansen 2000	SC: Barnwell Co., shallow Carolina Bay	H:ANSP:57542a
Eunotia praerupta Ehrenberg	USA	
Eunotia praerupta var. *bidens* (Ehrenberg) Grunow	USA	
Eunotia punctastriatum Camburn & Charles 2000	NY: Hamilton Co., Queer Lake	H:ANSP:57553
Eunotia recta Hustedt 1913	OR: Columbia River	L:BRM:L3/5
Eunotia rostellata Hustedt ex Patrick 1945	NV: Kings River	L:BRM:239/63
Eunotia serraceniae Gaiser & Johansen 2000	SC: Barnwell Co, shallow Carolina bay	H:ANSP:57543a
Eunotia submonodon Hustedt 1913	OR: Columbia River	L:BRM:L3/60
Eunotia tauntoniensis Hustedt	MA: Taunton	H:BRM:L1/15
Eunotia torula Holm 1961	FL: Silver Springs	H:ANSP:44474
Eunotia zasuminensis var. *minor* Kalinsky 1984	LA: Bossier Parish, Cypress Bayou Res.	H:ANSP:53902
Fragilaria aequalis var. *major* Tempère & Peragallo 1090	OR: Klamath Co., Swan Lake	I:CAS/ANSP: T & P (2) 365, 366
Fragilaria crotonensis Kitton	NY: Croton River	
Fragilaria crotonensis var. *oregona* Sovereign	OR: Diamond Lake	H:CAS:205072
Fragilaria dibolos Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Fragilaria floridana Hanna	FL	
Fragilaria glebula Hohn & Hellerman 1963	MD: Potomac River	H:ANSP:44467
Fragilaria gnathostoma Hohn 1961	FL: Silver Springs	H:ANSP:44474
Fragilaria interstincta Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469
Fragilaria marina var. *parva* Tempère & Peragallo 1908	WA: Tacoma	I:CAS/ANSP: T & P (2) 107, 108
Fragilaria rhodana Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44471
Fragilaria robusta Hustedt	FL: Pensacola	L:BRM:Ka/7
Fragilaria sinnata M. Peragallo	OR: Klamath Co., Swan Lake	L:ANSP:T & P (2) 366
Fragilaria suboldenburgiana Camburn & Charles 2000	NY: Herkimer Co., Buck Pond	H:ANSP:57552
Fragilaria synegrotesca Lange-Bertalot 1993	FL: Everglades	H:Lange-Bertalot, BIUFaM:Am-N 66
Fragilaria vaucheriae f. contorta Lowe 1972	IA	H:ISU:7-4-69 #2
Frustulia asymmetrica (Cleve) Hustedt	NJ	
Frustulia bahlsii Edlund & Brant 1997	NC: Hayward Co., Flat Laurel Gap Bog	H:ANSP:56842
Frustulia pseudomagaliesmontana Camburn & Charles 2000	NY: Herkimer Co., Fourth Lake (Bisby Lakes)	H:ANSP:57556
Frustulia rhomboides f. *occidentalis* Sovereign	OR: Crater Lake National Park, Water Supply Spring	H:CAS:205089
Gomphoneis elegans (Grunow) Cleve	CA: Shasta	
Gomphoneis eriense (Grunow) Skvortzow in Skvortzow & Meyer	Lake Erie	
Gomphoneis eriense var. *angularis* Kociolek & Stoermer 1988	OR: Emerald Pool, Crater Lake	H:CAS:Sovereign 488-1
Gomphoneis eriense var. *apiculata* Stoermer in Reimer 1982	IA: Dickinson Co., Lake W. Okoboji	H:I.L.L.:L-2-12
Gomphoneis eriense var. *rostrata* (M. Schmidt) Skvortzow in Skvortzow & Meyer	CA: Pitt River	
Gomphoneis eriense var. *variabilis* Kociolek & Stoermer 1988	MT: Bitteroot River	H:ANSP:64382

Gomphoneis geitleri Kociolek & Stoermer	MN: Cook Co., Lake Superior	H:CAS:216020
Gomphoneis herculeana (Ehrenberg) Cleve	Lake Huron: Maekinaw Island	H:Humboldt-Berlin 1754; I:Farlow 1967
Gomphoneis herculeana var. *abundans* Kociolek & Stoermer 1988	CA/NV: Lake Tahoe, Sunnyside	H:ANSP:64380
Gomphoneis herculeana var. *clavata* Cleve	OR: Pitt River (probably CA)	
Gomphoneis herculeana var. *lowei* Kociolek & Stoermer 1988	OR: Emerald Pool, Crater Lake	H:CAS:Sovereign 488-1
Gomphoneis herculeana var. *robusta* (Grunow) Cleve	NY	S:ANSP:Cl. & Moll. 40
Gomphoneis herculeana var. *rostrata* Tempère & Peragallo	OR: Klamath Co., Swan Lake	I:CAS?ANSP: T & P (2) 365, 366
Gomphoneis linearis Kociolek & Stoermer 1986	OR: Jefferson Co., Metolius River	H:ANSP:64162
Gomphoneis mammilla (Ehrenberg) Cleve	OR: Fall River	
Gomphoneis quadripunctata var. *cochleariformis* Kociolek & Stoermer	Lake Superior	H:CAS:216019;Koeiolek & Stoermer 1991
Gomphoneis rostrata (Tempère & Peragallo) Kociolek & Stoermer 1988	OR: Swan Lake	
Gomphoneis rostrata var. *valida* Kociolek & Stoermer 1988	OR: Swan Lake	H:ANSP:T & P (2) 3666
Gomphoneis subherculeana Kociolek & Stoermer 1988	OR: Lane Co., W. Odell Lake	H:ANSP:64381
Gomphoneis trullata Kociolek & Stoermer 1986	OR: Lane Co., Linton Lake	H:ANSP:64161
Gomphonema affine var. *rhombicum* Reichardt 1999	UT: Washington Co., Spring at Zion National Park	H:B:S1838-T01
Gomphonema angustatum var. *elongata* M. Peragallo in Tempère & Peragallo 1908	CT: Bristol, Fall Mountain	I:CAS/ANSP:T & P (2): 103, 104
Gomphonema apicatum Ehrenberg	NY	
Gomphonema apiucto Wallace	GA: Worth Co., Flint River	H:ANSP:4242b
Gomphonema christensenii Lowe & Koeiolek 1984	Great Smoky Mountains National Park, Big Creek	H:ANSP:53920
Gomphonema citera Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Gomphonema consector Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Gomphonema constrictum var. *cuneata* A. Schmidt 1904	MA: Waltham; RI: Pawtucket	
Gomphonema cumrhis Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Gomphonema freesei Lowe & Kociolek 1984	Great Smoky Mountains National Park, Bower Creek	H:ANSP:53921
Gomphonema germainii Kociolek & Stoermer 1990	Lake Superior	H:CAS:216008
Gomphonema gibba Wallace	FL: Santa Rosa County, Escambia River	H:ANSP:4356a
Gomphonema grovei M. Schmidt 1899	OR: Pitt River	
Gomphonema herculeanum Ehrenberg 1845	Lake Huron: Mackinaw Island	H:Humboldt-Berlin 1754; I:Farlow 1967
Gomphonema instabilis Hohn & Hellerman 1963	OH	H:CAS:Ward F-188-1
Gomphonema kobayasii Kociolek & Kingston 1999	NY: Westehester Co., Saw Mill River at Yonkers	H: CAS: 218005
Gomphonema leptocampnm Kociolek & Stoermer 1991	Lake Superior	H:CAS:216016
Gomphonema louisiananum Kalinsky 1984	LA: Bossier Parish, Cypress Bayou Res.	H:ANSP:53900
Gomphonema maclaughlinii Reichardt 1999	UT: Washington Co., Spring at Zion National Park	H:B:S1838-T01
Gomphonema mambrium Fricke	ME: Orono River	I:ANSP:T&P 887
Gomphonema mehleri Camburn 1978	SC: York Co., Long Branch Creek	H:ANSP:54754
Gomphonema patricki Kociolek & Stoermer	CA: Fresno Co., Sequoia Lake	H:CAS:217015
Gomphonema pseudopusillum Reichardt 1999	CA: Lassen National Park, Manzanita Lake	H:B:S1131 H2-N
Gomphonema pygmaeum Kociolek & Stoermer 1991	MI: Chippewa Co., Lake Superior	H:CAS:216015

Gomphonema semiapertum Grunow	CA: Shasta	
Gomphonema septum Moghadam	MT: Flathead Lake	H:ANSP:62242
Gomphonema simus Hohn & Hellerman 1963	MD: Potomac River	H:ANSP:44468
Gomphonema sparsistriatum f. *maculatum* Camburn 1978	SC; York Co., Long Branch Creek	H:ANSP:53755
Gomphonema sphaerophorum Ehrenberg	NY; "Vivum in Niagara"	
Gomphonema stonei Reichardt 1999	NC: Cape Hatteras lighthouse, pond	H:B:S1840-T01
Gomphonema submehleri Kociolek & Stoermer 1991	Lake Superior	H:CAS:216018
Gomphonema subtile Ehrenberg	NY: West Point	
Gomphonema superiorensis Kociolek & Stoermer 1991	MI: Houghton Co., Lake Superior	H:CAS:216017
Gomphonema tackei var. *brevistriatum* Camburn 1978	SC: York Co., Long Branch Creek	H:ANSP:53756
Gomphonema truncatum var. *macilentum* Kociolek & Stoermer 1991	Lake Michigan	H:CAS:216014
Gomphonema truncatum var. *turgidum* (Ehrenberg) Patrick	NY	
Gomphonema tumens Kociolek & Stoermer 1991	Lake Superior	H:CAS:Stoermer 1867
Gomphonema turgidum Grunow	RI: Smithfield	Icono:Ehrenberg, Mikrogeologie, p. 15, pl. IV,2, fig. 34; BHUPM:Kasten 26, Buch 5, Mica--Streifen 8, Mica NR 2
Gomphonema turris Ehrenberg	NY: West Point	
Gomphonema variostriatum Camburn & Charles 200	MI: Schoolcraft Co., Cusino Lake	H:ANSP:57551
Gomphonitzschia exigua Sovereign 1958	OR: Crater Lake	H: CAS: 205086
Gyrosigma obtusatum (Sullivan & Wormley) Boyer	OH: Columbus	L:ANSP:Boyer W-VI-20
Gyrosigma sciotense (Sullivan & Wormley) Cleve	OH: Columbus	L:ANSP:Boyer W-VI-17
Gyrosigma spencerii (Quekett) Griffen & Henfrey	NY: Croton River	I:ANSP:3174
Gyrosigma temperei Cleve	CT: "Eaux saumatres"	
Gyrosigma terryanum f. *fontanum* Reimer	FL: Green Spring	H:ANSP:2861
Gyrosigma wormleyi (Sullivant) Boyer	OH: Columbus	L:ANSP:Boyer W-VI-14
Hantzschia vivax var. *granulata* M. Peragallo in Tempère & Peragallo 1908	CT: Bristol, Fall Mountain	I:CAS/ANSP: T & P (2) 103, 104
Mastogloia angusta Hustedt 1933	CT: Morris Cove	H:BRM:R1/89
Melosira distans var. *nivaloides* Camburn 1986	WI: Oneida Co., Dorothy Lake	H:ANSP:54241
Melosira nygaardii Camburn 1986	MI: Alger Co., Sand Lake	H:ANSP:54240
Melosira perglabra var. *floriniae* Camburn 1986	MI: Chippewa Co., McNearney Lake	H:ANSP:54239
Melosira pseudoamericana Camburn 986	MI: Schoolcraft Co., Cusino Lake	H:ANSP:54238
Meridion alansmithii Brant 2003	NC: Avery Co., Sugar Mountain Bog	H:ANSP: 57560

Meridion anceps (Ehrenberg) Williams	MA: Pelham	
Meridion hohii Rhode 2001	WA: Olympie National Forest, Hoh River	H:CAS:221016
Meridion intermedium H.L. Smith 1878	TN: Knoxville	I:CAS/ANSP: H.L. Smith 238
Meridion lineare (H.L. Smith) D.M. Williams	OH: Gambier	L:BM:25798 (H.L. Smith 237)
Microsiphona potamos Weber		P:ANSP:51571
Navicula achthera Hohn & Hellerman 1963	MD: Potomae River	H:ANSP:44467
Navicula acrosphaeria var. *dilata* Tempère & Peragallo 1908	CT: Birge's Pond	I:CAS/ANSP: T & P (2) 36, 37
Navicula aikenenses Patrick	SC: Aiken Co., Savannah River	H:ANSP:4737a
Navicula alea Hohn & Hellerman 1963	MD: Potomae River	H:ANSP:44466
Navicula alpina var. *elongata* M. Peragallo in Tempère & Peragallo 1908	WA: Taeoma	I:CAS/ANSP: T & P (2) 107, 108
Navicula americana Ehrenberg	NY: West Point	
Navicula americana var. *moesta* Tempère & Peragallo	MA: Essex Co., Georgetown, Boldpatte Pond	L:ANSP:T & P (2) 159
Navicula amnicola Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Navicula anatis Hohn & Hellerman 1963	MD: Potomae River	H:ANSP:44467
Navicula antinitescens M. Peragallo in Tempère & Peragallo 1908	WA: Taeoma	I:CAS/ANSP: T & P (2) 107, 108
Navicula argutiola Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Navicula aurora Sovereign	OR	H:CAS:205078
Navicula bastianii M. Pergallo in Tempère & Peragallo 1909	CT: Plainville, Hamlin's Pond	I:CAS/ANSP: T & P (2) 340, 341
Navicula bdesma Hohn 1961	FL: Silver Springs	H:ANSP:44489
Navicula bergenensis Hohn 1952	NY: Genesee Co., Bergen Swamp	H:Wiegand Herb., Cornell
Navicula biconica Patrick 1959	SC: Aiken Co., Savannah River	H:ANSP:44492
Navicula bievexa Hohn 1961	FL: Silver Springs	H:ANSP:44489
Navicula birhis Hohn 1961	FL: Silver Springs	H:ANSP:44484
Navicula bita Hohn 1961	FL: Silver Springs	H:ANSP:44474
Navicula bogotensis var. *iniinterrupta* M. Peragallo in Tempère & Peragallo 1908	CT: Bristol, Fall Mountain	I:CAS/ANSP: T & P (2) 103, 104
Navicula bogotensis var. *undulata* M. Peragallo in Tempère & Peragallo 1908	CT: Bristol, Fall Mountain	I:CAS/ANSP: T & P (2) 103, 104
Navicula canoris Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469
Navicula capsa Hohn 1961	FL: Silver Springs	H:ANSP:44474
Navicula caractacus Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469
Navicula caroliniana Patriek	SC: Aiken Co., Savannah River	H:ANSP:44496
Navicula cascadensis Sovereign	OR: Diamond Lake	H:CAS:205077
Navicula caterva Hohn & Hellerman 1963	MD: Potomae River	H:ANSP:44466
Navicula cementia Hohn 1961	FL: Silver Springs	H:ANSP:44484
Navicula cincta var. *rostrata* Reimer 1961	IN: Randolph Co., Cabin Creek bog	H:ANSP:45669
Navicula cinna Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP44470
Navicula columbiana Hustedt 1966	OR: Columbia River	H:BRM:N14/32
Navicula complanatula Hustedt 1962	OR: Charleston	L:BRM:N14/5

Navicula contortula Sovereign	WA: Pend Oreille Co., Bead Lake	H:CAS:205092
Navicula contraria Patrick	SC: Aiken Co., Savannah River	H:ANSP:4737a
Navicula convergens Patrick 1959	SC: Aiken Co., Savannah River	H:ANSP:3954a
Navicula cremorue Hohn & Hellerman 1963	MD: Potomac River	H:ANSP:44467
Navicula crenzburgensis var. *multistriata* Patrick 1959	TX: Orange Co., Sabine River	H:ANSP:6679a
Navicula cryptogaster Lowe 1972	IA	H:ISU:11-14-69 #3
Navicula cuspidata var. *obtusa* Patrick	CO: Radford Peak	H:ANSP:Boyer A-6-15
Navicula dailyi Reimer 1961	IN: Randolph Co., Cabin Creek bog	H:ANSP:45669
Navicula dicephala var. *lata* M. Peragallo in Tempère & Peragallo 1908	CT: Bristol, Fall Mountain	I:CAS/ANSP: T & P (2) 103, 104
Navicula dibola Hohn 1961	FL: Silver Springs	H:ANSP:44487
Navicula disputans Patrick	SC: Aiken Co., Savannah River	H:ANSP:44496
Navicula distinctastriata Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44468
Navicula dubia var. acuminata Tempère & Peragallo 1911	ME: Crane Pond	I:CAS/ANSP: T & P (2) 586-588
Navicula dulcis Patrick	TX: Orange Co., Sabine River	H:ANSP:8035
Navicula duomedia Patriek 1959	SC: Aiken Co., slough of Savannah River	H:ANSP:4426a
Navicula dystrophica Patrick 1959	SC: Aiken Co., near mouth of Upper Three Runs	H:ANSP:44254a
Navicula ebor Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44470
Navicula elegantissima M. Peragallo in Tempère & Peragallo 1908	CT: Bristol, Fall Mountain	I:CAS/ANSP: T & P (2)103, 104
Navicula elginensis var. *lata* (M. Peragallo) Patrick	CT: Bristol, Fall Mountain	L:ANSPT & P (2) 104?
Navicula elmorei Patrick	NE: pool, 1 mile W of Fremont	H:CAS:NY Elmore 704
Navicula eponka Hohn 1961	FL: Silver Springs	H:ANSP:44491
Navicula evexa Sovereign	WA: Pend Oreille Co., Bead Lake	H:CAS:205093
Navicula exigua var. *capitata* Patriek	PA: Pike Co., Shohola Falls	H:ANSP:2200
Navicula flexuosa var. *cuneata* Tempère & Peragallo	WA: Puget Sound, Orca Island	I:CAS/ANSP: 302, 303
Navicula fluminitica Camburn	SC: York Co., Long Branch Creek	H:ANSP:53748
Navicula friesneri Reimer	IN: Randolph Co., Cabin Creek bog	H:ANSP:45669
Navicula gastrum f. *maxima* Tempère & Peragallo	OR: Klamath Co., Swan Lake	I:CAS/ANSP: T & P (2) 365, 366
Navicula germainii Wallaee	PA: Laneaster Co., Little Muddy Creek	H:ANSP:42397a
Navicula goersii Bahls 1983	MT	H:ANSP:63245
Navicula gravistriata Patrick 1959	TX: Orange Co., Sabine River	H:ANSP:8031
Navicula hyalosirella Hustedt 1962	FL: St. Petersburg, Pass-a-Grille	H:BRM:N18/22
Navicula imbellis Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44460
Navicula incoupta var. *incurva* Reimer 1990	IA: Diekinson Co., Exeelsior Fen	H:I.L.L.:L-6-46
Navicula indianensis Reimer	IN: Randolph Co., Cabin Creek bog	H:ANSP:45669
Navicula infrenis Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44470
Navicula karsia Hohn	FL: Silver Springs	H:ANSP:44491
Navicula keeleyi Patriek	PA: Pike Co., Shohola Falls	H:ANSP:2197
Navicula kincaidii Sovereign	OR: Crater Lake National Park, Vidae Fall	H:CAS:205094
Navicula lalia Hohn & Hellerman 1963	MD: Potomac River	H:ANSP:44468
Navicula latelougitudinalis Patrick 1959	SC: Aiken Co., slough of Savannah River	H:ANSP:44258a
Navicula lateropunctata Wallace	SC: Aiken Co., Upper Three Runs	H:ANSP:4072a

Navicula litos Hohn & Hellerman 1963	MD: Potomac River	H:ANSP:44466
Navicula ludloviana A. Schmidt	WA: Fort Ludlow	
Navicula maculata var. *orbiculata* Patrick	AL: Mobile	H:CAS: NY, Ward B-36-16
Navicula meaudrinoides Hustedt 1930	OR: Columbia River	H:BRM:N5/57
Navicula mediocris var. *intermedia* Reimer	SC: Aiken Co., Upper Three Runs Creek	H:ANSP:44260a
Navicula microstaurou var. *stauroneiformis* Tempère & Peragallo 1908	OR: Klamath Co., Swan Lake	l:CAS/ANSP: T & P (2) 365, 366
Navicula migua Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44460
Navicula minnewaukonensis Elmore	ND: Devil's Lake	l:CAS:NY Elmore 634
Navicula minthe Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469
Navicula minuscula f. *linearis* Reimer 1970	IA: Dickinson Co., Cayler Prairie	H:ANSP:61083
Navicula mobiliensis Boyer	AL: Mobile Co., Mobile	L:ANSP:Boyer 747
Navicula mobiliensis var. *minor* Patrick 1959	PA:Chester Co., Ridley Creek	H:ANSP:44497
Navicula monmouthiana-stodderi Yermeloff	NY: Mohawk River	
Navicula montana Moghadam	MT: Flathead Lake	H:ANSP:62310d
Navicula multigranum Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469
Navicula muscerda Hohn	FL: Silver Springs	H:ANSP:44489
Navicula mutica var. *stigma* Patrick 1959	SC: Barnwell Co., Savannah River	H:ANSP:3568a
Navicula narinosa Hohn	FL: Silver Springs	H:ANSP:44489
Navicula nemoris Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469
Navicula nimbus Hohn & Hellerman 1963	MD: Potomac River	H:ANSP:44467
Navicula notha Wallace	VA: Louisa Co., North Anna River	H:ANSP:4613b
Navicula nugalis Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Navicula obdurata Hohn & Hellerman 1963	PA: Lancaster Co., Lititz Run	H:ANSP:4695a
Navicula oblongiformis Hustedt 1934	OR: Columbia River	L:BRM:N10/7
Navicula obtuseprotracta Hustedt 1966	OR: Columbia River	H:BRM:N14/31
Navicula ocallii Hohn 1961	FL: Silver Springs	H:ANSP:44484
Navicula odiosa Wallace	TX: Calhoun Co., Mission Lake	H:ANSP:6853a
Navicula orangiana Patrick 1959	TX: Orange Co., Sabine River	H:ANSP:6535a
Navicula orbiculata Patrick 1959	TX: Orange Co., Sabine River	H:ANSP:8030
Navicula paludosa f. *rhomboidea* Reimer 1970	IA: Dickinson Co., Cayler Prairie	H:ANSP:61083
Navicula parablis Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44466
Navicula parodia Hohn 1961	FL: Silver Springs	H:ANSP:44489
Navicula paucivisitata Patrick 1959	SC: Aiken Co., Savannah River	H:ANSP:44274a
Navicula pennsylvanica Patriek	PA: Pike Co., Greeley	H:ANSP:2188
Navicula peregrina var. *truncata* M. Peragallo in Tempère & Peragallo 1908	WA: Tacoma	I:CAS/ANSP: T & P (2) 107, 108
Navicula peticolasii M. Peragallo	OR: Klamath Co., Swan Lake	L:ANSP:T & P (2) 365
Navicula placenta Ehrenberg	OR:Columbia River	
Navicula pletura Hohn 1961	FL: Silver Springs	H:ANSP:44474
Navicula poconoensis Patrick 1945	PA:Pike Co., Greeley	H:ANSP:2188
Navicula potzgeri Reimer 1961	IN: Randolph Co., Cabin Creek bog	H:ANSP:45669
Navicula potgeri var. *quadripunctata* Reimer 1961	IN: Randolph Co., Cabin Creek bog	H:ANSP:45669

Navicula pragma Hohn & Hellerman 1963	MD: Potomac River	H:ANSP:44466
Navicula pseudofrickia Patrick	NJ: Passaic Co., Newfoundland	H:CAS:NY J Grant 16 Nov 1928
Navicula pseudoreinhardtii Patrick	SC: Aiken Co., Savannah River	H:ANSP:4737a
Navicula pseudosilicula var. *olympica* Sovereign	WA: Olympic National Park, Waterhole Camp	H:CAS:205095
Navicula pupula var. *lineare* Tempère & Peragallo 1908	CT: New Britain, Ice Pond	I:CAS/ANSP: T & P (2) 78
Navicula radiosa var. *parva* Wallace	FL: Santa Rosa Co., Escambia River	H:ANSP:4373b
Navicula radiosa var. *subrostrata* Cleve	[MA]: Crane Pond	
Navicula rainierensis Sovereign	WA: Mt. Rainier National Park,	H:CAS:205096
Navicula recava Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469
Navicula rivalis Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Navicula rugula Hohn & Hellerman 1963	GA: Four Mile Run	H:ANSP:44472
Navicula sabiniana Patriek	TX: Orange Co., Sabine River	H:ANSP:8030
Navicula sagitta Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44470
Navicula savannahiana Patrick	SC: Aiken Co., Savannah River at Mile 134	H:ANSP:4737a
Navicula schroeteri var. *escambia* Patrick	FL: Santa Rosa Co., Escambia River	H:ANSP:6564a
Navicula secura Patrick	SC: Aiken Co., near mouth of Upper Three Runs	H:ANSP:44254a
Navicula secreta var. *apiculata* Patrick	TX: Victoria Co., Guadalupe River	H:ANSP:6604a
Navicula seminulum var. *hustedtii* Patrick	SC: Aiken Co., near mouth of Upper Three Runs	H:ANSP:4425a
Navicula sinuula Patrick 1959	SC: Aiken Co., Savannah River	H:ANSP:44259a
Navicula skalenastriata Hohn 1961	FL: Silver Springs	H:ANSP:44474
Navicula smithii var. *dilatata* M. Peragallo in Tempère & Pergallo 1908	CT: Bristolm Fall Mountain	I:CAS/ANSP: T & P (2) 103, 104
Navicula subfasciata Patrick 1959	SC: Aiken Co., Savannah River	H:ANSP:44259a
Navicula subhexagona Hustedt 1934	OR: Columbia River	L:BRM:N10/2
Navicula swaniana Moghadam	MT: Flathead Lake	H:ANSP:62306a
Navicula texana Patrick	TX: Guadalupe Co., near Seguin	H:ANSP:6587a
Navicula typografica Hustedt 1930	OR: Columbia River	L:BRM:N8/80
Navicula umbra Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469
Navicula venerablis Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Navicula vitabunda var. *montana* Moghadam	MT: Flathead Lake	H:ANSP:62304b
Navicula walkeri Sovereign	OR: Crater Lake	H:CAS:205079
Navicula wallacei Reimer 1966	SC: Aiken Co., Savannah River	H:ANSP:4628a
Navicula wardii Patrick 1959	AL: Spring Hill	H:CAS:NY Ward D-4-21
Navicula yorkensis Camburn 1987	SC: York Co., Long Braneh Creek	H:ANSP:53747
Neidium affine (Ehrenberg) Pfitzer	Several NY, MA	
Neidium affine var. *humerus* Reimer	MD: Montgomery Co., Potomac River	H:ANSP:44285a
Neidium apiculatum Reimer	SC: Aiken Co., Upper Three Runs Creek	H:ANSP:44266c
Neidium apiculatum var. *constrictum* Reimer	SC: Aiken Co., Upper Three Runs Creek	H:ANSP:44266b
Neidium bisulcatum var. *subundulatum* (Grunow) Reimer	NY: Hudson River, Sing Sing	
Neidium boyeri Reimer	NH: Sullivan Co., near Sunapee Perkins Pond	H:ANSP:Boyer 778
Neidium cape-codii Siver & Hamilton in Siver et al.	MA: Cape Cod, Little Cliff Pond	H:CAS:221031

Neidium floridanum Reimer	FL: Taylor/Lafayette Co. line	H:ANSP44155b
Neidium hercynicum f. *subrostratum* Wallace	SC: Aiken Co., Upper Three Runs Creek	H:ANSP:3984a
Neidium hitchcockii (Ehrenberg) Cleve	MA: Bridgewater	
Neidium hitchcockii f. *teres* Sovereign	WA: Callam Co., Ozette Lake	H:CAS:205091
Neidium tumescens (Grunow) Cleve	ME: Cherryfield	
Neidium inconstans Sovereign	WA: Adams Co., Finnel Lake	H:CAS:205090
Neidium iridis (Ehrenberg) Cleve	NY: West Point	
Neidium iridis var. *amphigomphus* (Ehrenberg) A. Mayer	Several, NY, CT, MA, ME	
Neidium kozolwi var. *baicalensis* f. robusta Stoermer 1963	IA: Dickinson Co., W. Lake Okoboji	H:ANSP:8301
Neidium kozlowi var. *undulata* Stoermer 1963	IA: Dickinson Co., W. Lake Okoboji	H:ANSP:8299a
Neidium ladogense var. *densestriatum* f. *peribryum* Lowe & Kociolek 1984	Great Smoky Mountains National Park	H:ANSP:53919
Neidium maximum (Cleve) Meister	NY: Sullivan Co., Monticello	
Neidium rudimentarum Reimer	NJ: Winslow, Blue Hole, Inskip River	H:ANSP:Boyer W-6-23
Neidium sacoense Reimer	ME: York Co. (?), Saco Pond	H:ANSP:Sehulze 367
Neidium temperei Reimer	CT: Hartford Co., Bristol, Tamaraek Swamp	H:ANSP:T & P (2) 211
Neidium tumescens (Grunow) Cleve	ME: Cherryfield	
Nitzschia abridia Camburn 1978	SC: York Co., Long Branch Creek	H:ANSP:53750
Nitzschia asymbasia Hohn 1961	FL: Silver Springs	H:ANSP:44474
Nitzschia bella Sovereign	WA: Pend Oreille Co., Bead Lake	H:CAS:206009
Nitzschia biacrula Hohn & Hellerman 1963	MD: Potomac River	H:ANSP:44466
Nitzschia bicrena Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44460
Nitzschia bita Hohn & Hellerman 1963	TX: Guadalupe Co. Guadalupe River	H:ANSP:3628a
Nitzschia bubheimiana var. *capitata* Reimer 1966	SC: Barnwell Co., Savannah River	H:ANSP:44264a
Nitzschia columbiana Sovereign 1958	OR: Diamond Lake	H:CAS:205084
Nitzschia congolensis var. *mooreae* Reimer 1982	IA: Kossuth Co., Union Slough	H:I.L.L.:L-2-90
Nitzschia dissipata f. *undulata* Sovereign	WA: Mt. Rainier National Park, Lake Louise	H:CAS:206010
Nitzschia exilis Sovereign 1958	OR: Crater Lake	H:CAS:205085
Nitzschia fonticoloides Sovereign	OR: Crater Lake	H:CAS:205081
Nitzschia incomptus Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469
Nitzschia innominata Sovereign	OR	H:CAS:205082
Nitzschia monoensis Kociolek & Herbst 1992	CA: Mono Lake	H:CAS:216061
Nitzschia montanestris Camburn 1978	SC: York Co., Long Branch Creek	H:ANSP:53749
Nitzschia oregana Sovereign	OR: Diamond Lake	H:CAS:205083
Nitzschia perspicillata Camburn 1978	SC: York Co., Long Braneh Creek	H:ANSP:53751
Nitzschia perspicua Sovereign	WA: Pend Oreille Co., Bead Lake	H:CAS:206011
Nitzschia pertica Hohn & Hellerman 1963	MD: Potomae River	H:ANSP:44467
Nitzschia plana var. *americana* Hustedt 1924	NY: Lake Champlain	L:BRM:W1/25
Nitzschia reimerii Kociolek & Herbst 1992	CA: Mono Lake	H:CAS:216060
Nitzschia semidesum Hohn & Hellerman 1963	MD: Potomae River	H:ANSP:44468
Nitzschia sentiformis Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469

Nitzschia serpentiraphe Lange-Bertalot 1993	FL: Everglades	H:Lange-Bertalot, BIUFaM:Am-N 69
Nitzschia silicula var. *commutata* Reimer 1966	SC: Barnwell Co., Savannah River	H:ANSP:44268a
Nitzschia volcanica Sovereign 1958	OR: Crater Lake	H:CAS:205080
Nupela carolina Potapova & Clason 2003	NC: Contentnea Creek	H:ANSP:57568
Nupela neglecta Ponader, Lowe & Potapova 2003	NJ: Coles Brook	H:ANSP:57569
Opephora americana M. Peragallo	OR: Klamath Co., Swan Lake	I:ANSP: T & P (2) 365 366
Opephora ausata Hohn & Hellerman 1963	MD: Potomac River	
Peronia intermedium (H.L. Smith) Patrick	TN: Knoxville	L:ANSP:H.L. Smith 238
Pinnularia abaujensis var. *lacustris* Camburn & Charles 2000	NY: Herkimer Co., Merriam Lake	H:ANSP:57554
Pinnularia abaujensis var. *rostrata* (Patrick) Patrick	PA: Monroe Co., Pocono Lake Reserve	H:ANSP:2213
Pinnularia acrosphaeria var. *turgidula* Grunow ex Cleve	MA: Waltham, Crane Pond	L:NW:2009
Pinnularia alabamae Krammer 2000	AL: Mongomery	H:BRM:P2/69
Pinnularia amblys Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44469
Pinnularia biceps var. *pusilla* Camburn & Charles 2000	NY: Herkimer Co., Merriam Lake	H:ANSP:57554
Pinnularia bigibba Gaiser & Johansen 2000	SC: Barnwell Co., shallow Carolina bay	H:ANSP:57545a
Pinnularia biltastata (A. Mann) Patrick	CA: Big Lake	
Pinnularia bogotensis var. undulata (Peragallo)	CT: Bristol, Fall Mountain	
Pinnularia boyeri Patrick	NH	H:ANSP:Boyer V-5-5
Pinnularia burkii Patrick	PA: Pike Co., Greeley	H:ANSP:2189
Pinnularia cardinaliculis Cleve	MA: Waltham, Crane Pond	I:BRM:P1/50
Pinnularia caudata (Boyer) Patrick	PA: Newtown Square	L:ANSP:Boyer V-5-2
Pinnularia cherryfieldiana Krammer 2000	ME: Cherryfield	H:1049A
Pinnularia clevei Patrick 1945	PA: Monroe Co., Jaggie's Bog	H:ANSP:2225
Pinnularia convexa Sovereign	WA: Skamania Co., Lake Olallie ("Sheep lake")	H:CAS:205097
Pinnularia cumvibia Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Pinnularia cuneicephala (Mann) Patrick	MA: Crane Pond, Waltham	
Pinnularia dactylus var. *dariana* (A. Schmidt) Cleve	USA	
Pinnularia divergens var. *bacillaris* (M. Peragallo) Mills	CT: Bristol, Bunnel's Pond	L:ANSP: T & P (2) 106
Pinnularia elongata Hustedt 1934	OR: Columbia River	L:BRM:P1/89
Pinnularia erratica var. *fossilis* Krammer	MA: Waltham	H:NW:2009
Pinnularia ferroindulgentissima Czarnecki & Cawley 1997	IA: Marion Co., Abandoned Coal Mineland Site	H:ANSP:61660a
Pinnularia flexuosa Cleve	ME: Cherryfield, Crane Pond	
Pinnularia flexuosa var. *gibbosa* Hustedt 1934	NJ: Hatfield Swamp	H:BRM:P2/3
Pinnularia formica (Ehrenberg) Patrick	ME: Blue Hill Pond	
Pinnularia fossilis Krammer 2000	AL: Montgomery	H:BRM:P4/5
Pinnularia gibba var. *gibba* Hustedt 1934	AL: Montgomery	H:BRM:P2/12
Pinnularia gibbiformis var. *floralensis* Dute & Sullivan 2000	AL: Taxodium ascendens swamp near Florala	H:ANSP:57550
Pinnularia gigas Ehrenberg	NY	Icono:Ehrenberg 1854: Fig. 2/III, 1

Pinnularia instita Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Pinnularia integra Grunow in Cleve 1895	MA: Waltham, Crane Pond; Freneh Pond	
Pinnularia kwacksii Camburn & Charles 2000	NY: Herkimer Co., Merriam Lake	H:ANSP:57554
Pinnularia legumen (Ehrenberg) Ehrenberg	NY: West Point	
Pinnularia major var. *capitata* Hustedt 1934	NH: Bonkerville	H:BRM:P2/90
Pinnularia major var. *pulchella* Boyer	NJ: Hammonton Pond	L:ANSP:Boyer 426
Pinnularia maior var. *transversa* (A. Schmidt) Cleve	"Monticello"	
Pinnularia makahana Sovereign	WA: King Co., Shadow Lake	H:CAS:205098
Pinnularia mesogongtya Ehrenberg	MA: "Andower" Boston	
Pinnularia microstauron var. *adirondackensis* Camburn & Charles 2000	NY: Herkimer Co., Merriam Lake	H:ANSP:57554
Pinnularia microstauron var. *lunicus* Camburn & Charles 2000	MN: Lake Co., Dunnigan Lake	H:ANSP:57558
Pinnularia mormonorum (Grunow) Boyer	UT: Salt Lake	
Pinnularia nobilis (Ehrenberg) W. Smith	"Ameriea"	
Pinnularia nubila Sovereign	WA: Skamania Co., Lake Olallie	H:CAS:205099
Pinnularia obtusa Sovereign	WA: King Co., Stevens Pass, boggy meadow	H:CAS:206002
Pinnularia palousiana Sovereign	WA: Grant Co., Vantage (fossil)	H:CAS:205100
Pinnularia platycephala f. *ornata* Sovereign	WA: Skamania Co., Lake Olallie	H:CAS:206003
Pinnularia pluviana Sovereign	WA: Adams Co., Finnel Lake	H:CAS:206004
Pinnularia podzorski Krammer 2000	FL: Clermont	H:IOK:804
Pinnularia pulchella (Boyer) Krammer	NJ: Hammonton Pond	
Pinnularia secernenda (A. Schmidt) Cleve	USA: Laconia	
Pinnularia sillimanorum Ehrenberg	[MA]: Crane Pond	
Pinnularia socialis (T.C. Palmer) Hustedt	PA: Media, Swampy pools	
Pinnularia subgibba var. *gracilis* Gaiser & Johansen 2000	SC: Barnwell Co., oxbow lake	H:ANSP:57546a
Pinnularia subgibba var. *lanceolata* Gaiser & Johansen 2000	SC: Aiken Co., shallow Carolina bay	H:ANSP:57547a
Pinnularia subgibba var. *sublinearis* Krammer 2000	MA: Waltham	H:NW:2009
Pinnularia subnodosa Hustedt 1934	OR: Columbia River	H:BRM:P3/78
Pinnularia subpalousiana Sovereign Patriek & Reimer 1966	WA: Kittitas Co., Haney Meadow	H:CAS:206001
Pinnularia trigonocephala Cleve	MA: Waltham; Hudson River;	
Pinnularia turfosiphila Gaiser & Johansen 2000	SC: Berkeley Co., Lime Sink	H:ANSP:57548a
Pinnularia turnerae Camburn & Charles 2000	MI: Luee Co., Kelly Lake	H:ANSP:57559
Pinnularia umbrosa Sovereign	WA: King County, Shadow Lake	H:CAS:206005
Pinnularia undula var. *major* (A. Schmidt) Krammer 2000	USA: Freneh's Pond	
Pinnularia undula var. *mesoleptiformis* Krammer 2000	AL: Montgomery	H:BRM:P2/74
Pinnularia ventricosa Hustedt 1934	OR: Columbia River	H:BRM:P3/98
Pinnularia wisconsinensis Camburn & Charles 2000	NY: Herkimer Co., Merriam Lake	H:ANSP:57557
Plagiotropis arizonica Czarneeki & Blinn 1978	AZ: Navajo Co., Cholla Lake	H:NAU:P100
Playaensis circumfimbriata Spaulding & Koeiolek 2002	NM: Harding Co., Payton Lake	H:CAS:221011
Playaensis furtiva Spaulding & Kociolek 2002	NM: Harding Co., Payton Lake	H:CAS:221011

Pleurosigma salinarum var. *boyeri* (Keeley) Reimer	FL: DeLeon Spring	L:ANSP:Boyer M-7-19
Pseudostaurosira clavatum Morales 2002	FL: Caloosahatchee River	H:ANSP:103590a
Pseudostaurosira trainorii Morales 2001	CT: Avery Pond	H:ANSP:4198
Pseudostaurosiropsis connecticutensis Morales 2001	CT: Avery Pond	H:ANSP:4198
Pseudostaurosiropsis geocolegarum f. *tridaidata* Morales 2005	FL: De Soto Co., Peace River	H:ANSP:103605b
Punctastriata uimetica Morales 2005	NE: Thomas Co., Dismal River	H:ANSP:106157a
Rhizosolenia eriensis H.L. Smith 1878	OH: Lake Erie at Cleveland	I:CAS/ANSP:H.L. Smith 447
Rhizosolenia gracilis H.L. Smith 1882	NY: Niagara River at Buffalo	
Rhoicosphenia curvata var. *major* Cleve	OR: Pitt River	
Sarcophagodes delicatula Morales 2002	FL: Caloosahatchee River	H:ANSP:103590a
Stauroneis acuta var. *terryana* Tempère ex Cleve	CT: Bristol, Fall Mountain	
Stauroneis alabamae Heiden 1903	AL: Montgomery	
Stauroneis alabamae var. *rostrata* Heiden 1903	AL: Montgomery	
Stauroneis anceps var. *americana* Reimer	SC: Aiken County, Upper Three Runs Creek	H:ANSP:44254a
Stauroneis anceps var. *capitata* M. Peragallo 1908	CT: Bristol, Fall Mountain	I:CAS/ANSP: T & P (2) 103, 104
Stauroneis anceps var. *subrostrata* Gaiser & Johansen2000	SC: Aiken Co., shallow Carolina bay	H:ANSP:57544a
Stauroneis bovbjergii Reimer 1990	IA: Dickinson Co., Excelsior Fen	H:I.L.L.:SP7
Stauroneis fluminea Patrick & Freese	AK: Nunivak Lake, Barrow, pool	H:ANSP:8193
Stauroneis frickei var. *angusta* Boyer	PA: Delaware Co., Newtown Square	H:ANSP:Boyer V-V-3
Stauroneis livingstonii Reimer	SC: Aiken Co., Upper Three Runs Creek	H:ANSP:44272a
Stauroneis nobilis var. *baconiana* (Stodder) Reimer	MA: Suffolk Co., West Roxbury, near Boston	
Stauroneis staurolineata Reimer	NH: Carroll County, Wolfboro	H:ANSP:H.L. Smith 502
Stauroneis stodderi Greenleaf in Lewis	NH: Exact locality not known	S:ANSP:Febiger 4466, GC45953, H.L. Smith F-56
Staurosira stevensonii Manoylov, Morales & Stoermer 2003	FL: Lee Co., Pacific Tomato Wetland	H:ANSP:57564
Staurosirella confusa Morales 2005	CA: Merced Co., Merced River	H:ANSP:106584a
Stenopterobia anceps f. *subacuta* Fricke in Hustedt 1912	NH	
Stenopterobia intermedia f. *undulata* Sovereign	WA: Skamania Co., Lake Olallie	H:CAS:206012
Stephanodiscus conspicueporus Stoermer, Hakansson & Theriot 1988	Lake Michigan	H:ANSP:55143a

Stephanodiscus invisitatus Hohn & Hellerman 1963	OH: Putnam Co., Auglaize River	H:ANSP:7059a
Stephanodiscus niagarae Ehrenberg 1845	NY: Niagara Falls	I:ANSP:42768
Stephanodiscus reimerii Theriot & Stoermer Theriot 1992	IA: Dickinson Co., W. Lake Okoboji	H:ANSP:64474a
Stephanodiscus superiorensis Stoermer & Theriot	Lake Superior	H:ANSP:53949
Stephanodiscusvestibulis Häkansson, Theriot & Stoermer 1986	IA: Dickinson Co., Lazy Lagoon	H:ANSP:63786
Stephanodiscus yellowstonensis Therior & Stoermer 1984	WY: Yellowstone Lake	H:ANSP:63257
Surirella acredula Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44460
Surirella adumbratus Hohn & Hellerman 1963	GA/NC: Screven Co.-Barnwell Co., Savannah River	H:ANSP:44257a
Surirella agmatilis Camburn 1978	SC: York Co., Long Branch Creek	H:ANSP:53758
Surirella alicula Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44458
Surirella barca Hohn & Hellerman 1963	MD: Potomac River	H:ANSP:44468
Surirella beadensis Sovereign	WA: Pend Oreille Co., Bead Lake	H:CAS:206013
Surirella carolinicola Camburn 1978	SC: York Co., Long Branch Creek	H:ANSP:53757
Surirella gracilis var. *gigantea* Tempère & Peragallo 1909	OR: Klamath Co., Swan Lake	I:CAS/ANSP: T & P (2) 365, 366
Surirella iowensis Lowe 1972-3	IA	H:ISU:5-3-68 #1
Surirella kittonii var. *aspernla* M. Peragallo in Tempère & Peragallo 1908	WA: Tacoma	I:CAS/ANSP: T & P (2) 107, 108
Surirella oregonica f. *minor* Tempère & Peragallo 1909	WA: Puget Sound, Orca Island	I:CAS/ANSP: T & P (2) 302, 303
Surirella palmeri Boyer	PA: Media	L:ANSP:Boyer C-VI-1
Surirella parma Sovereign	OR: Crater Lake National Park,	H:CAS:206014
Surirella stalagma Hohn & Hellerman 1963	PA: Ridley Creek	H:ANSP:44471
Surirella stoermerii Lowe 1972-3	IA	H:ISU:11-5-67 #4
Surirella terryi Ward	CT: New Britain, Ice Pond	I:CAS/ANSP: T & P (2) 78
Synedra cyclopum var. *robustum* Schulz	WI: Delavan Lake	
Synedra homostriata Hohn 1961	FL: Silver Springs	H:ANSP:44474
Synedra incisa Boyer	NE: Central City	L:ANSP:Boyer A-6-5
Synedra longiceps Ehrenberg 1845	Lake Huron: Mackinaw Island	I:ANSP: H.L. Smith 563
Synedra mazamaensis Sovereign	OR	H:CAS:205073
Synedra recava Hohn 1961	FL: Silver Springs	H:ANSP:44474
Synedra socia Wallace	GA: Screven Co., Savannah River	H:ANSP:4036a
Synedra ulna var. *chaseana* Thomas	Lake Michigan	
Tetracyclus rhombus var. *maxima* Tempère & Peragallo 1909	OR: Klamath Co., Swan Lake	I:CAS/ANSP: T & P (2) 365, 366